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ARS-S-42
May 1974

AGRICULTURAL RESEARCH SERVICE • U.S. DEPARTMENT OF AGRICULTURE

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Equipment has been developed for use on a form-fill-seal machine at the Southern Grain Insects Research Laboratory, Tifton, Ga., to infest rearing cavities (cells) with corn earworm, *Heliothis zea* (Boddie), eggs or with other similar insect eggs. These cavities are formed (32 per stroke) continuously and simultaneously in a 4 by 8 pattern on a 15.2-centimeter-wide by 1.2-millimeter-thick plastic strip (polystyrene). They are filled with eggs at rates up to 544 cavities per minute.

The forming machine makes a channel (3.2 millimeters wide by 3.2 millimeters deep by 2.7 centimeters long) between each two cavities for receiving the eggs. As the eggs hatch in these channels, the larvae move through an opening (0.8 millimeter by 1.59 centimeters) from the channels into the rearing cavities. After a few days of growth in the rearing cavities, the insects are too large to pass back through the small opening. A sealed cover around the two cavities prevents larvae from moving into other cavities.

The egg-placing equipment (fig. 1) consists essentially of a feeder, an inverted Y-shaped transition, and a hydraulic drive. The feeder[2] alines the eggs for distribution into the inverted Y. An electronically controlled gate allows the eggs to be discharged from the feeder at intervals synchronized to fill the egg channels. The eggs fall from the feeder through a flexible Tygon hose (9.5-millimeter outside diameter) into the inverted Y for distribution into the egg channels. The end of the hose over the Y moves uniformly along the length of the Y once for each stroke of the forming machine to deposit eggs in the channels. Then, the end of the hose returns to a starting position. The hose is moved by a hydraulic cylinder triggered electrically and synchronized with the electrical circuitry on the forming machine.

The inverted Y is made in two pieces to facilitate placement of the eggs in two channels simultaneously. The bottom of the inverted Y is located 12.7 millimeters above the web (plastic sheet with formed cavities); it groups and directs the eggs toward the channels. A floating section, which rides against the web, is attached to the bottom of the Y. It further directs eggs into the channels and is designed to facilitate cleaning with a brush or with compressed

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[2] Harrell, E. A., Burton, R. L., and Sparks, A. N. A machine to manipulate corn earworm eggs in a mass-rearing program. J. Econ. Entomol. 63: 1362–1363. 1970.

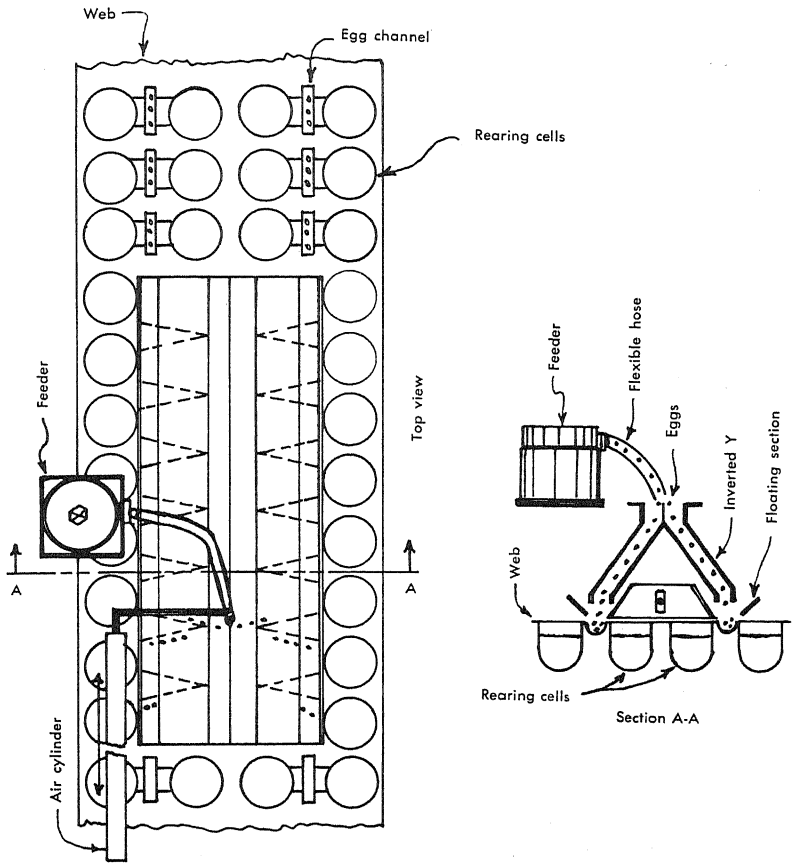

FIGURE 1.—Schematic of egg-placing equipment over web of corn earworm rearing cavities.

air. The location of the floating section close to the web helps to prevent eggs from bouncing out of the channels, and because the section floats, it can adjust to minor web irregularities and small obstacles without permanent displacement.

A wiring schematic for the feeder gate is shown in figure 2. The solenoid which opens and closes the gate is energized by an open relay that is used as a holding coil; microswitch S_1 (normally open) is closed momentarily to energize the coil and thus open the gate; microswitch S_2 (normally closed) is opened momentarily to close the gate and stop the flow of eggs from the feeder to the channels. Microswitch S_1 is activated by a cam on the forming machine and microswitch S_2 is activated by the hydraulic cylinder when it approaches the end of its stroke. The cams for activating both switches are adjustable so that egg delivery from the feeder to the channel can be regulated.

Additional information on this equipment may be obtained from the authors.

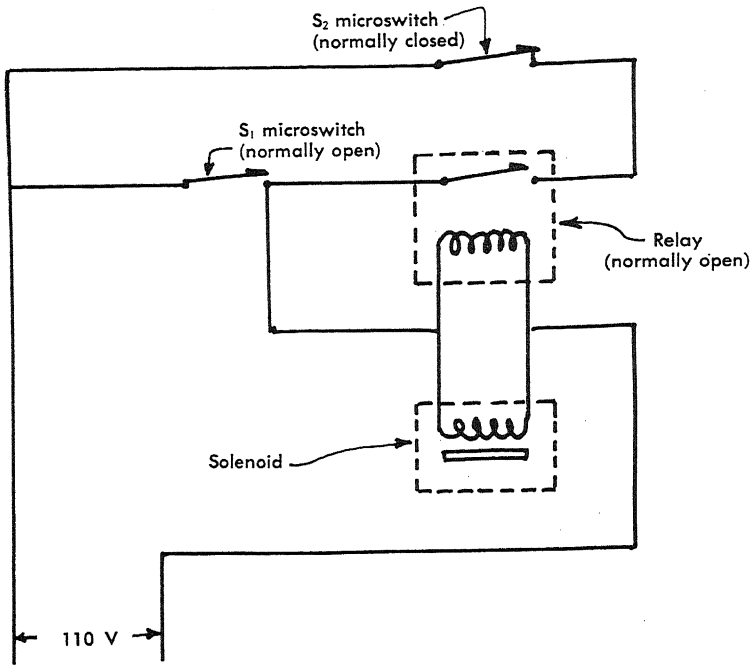

FIGURE 2.—Schematic of electrical circuit for feeder gate.

ACKNOWLEDGMENT

We express appreciation to J. H. Martin of this laboratory for his assistance in the development of this equipment.

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UNITED STATES DEPARTMENT OF AGRICULTURE
in cooperation with
Coastal Plain Experiment Station
University of Georgia